IEA Bioenergy T40

Country Report (Japan)

Shinichi Goto, Mitsuharu Oguma (AIST)

Yuji Iwasaki (NEDO)

Introduction

In Japan, 50 % of the total amount of wood for sawn timber is used for production of wood chips, and 70 % of the total wood chips consumed is imported. This means that wood chips used in Japan are predominantly imported. Wood chips have been used mainly for paper manufacturing and lumber (panel board) manufacturing in Japan. Recently, wood chips have been drawing attention as an alternative to fossil fuels, and its utilization has expanded to a thermal energy source and a raw material for synthetic liquid fuel production. Demand for paper products is anticipated to grow in the medium term, along with economic growth of developing countries. As mentioned above, Japan's wood chip supply relies significantly on raw material grown in foreign countries, and there is concern that the supply-and-demand balance of wood chips may become unstable. Therefore, it is important to increase the use of low-grade or unutilized wood to maintain a stable supply of wood chips. Also, the ability of timber to absorb carbon dioxide must be kept in mind. The Japan Forestry Agency proposed a plan to thin 3.3 million ha of the forest in six years.

In this report, the trends of supply, usage, and importation of wood chips in Japan are reported. In addition, the trends surrounding usage of wood pellets (which have higher energy density than wood chips) are also included in this report.

Supply and Demand of Wood Chips in Japan

Currently, 20 million BDT (Bone Dry Ton) of wood chips are used in Japan annually. The mass of 20 million BDT of wood chips corresponds to 37 million m^3 in volume of wood chips. As shown in Figure 1, almost 90 % of the wood chips consumed in Japan are used for paper pulp, 6-7 % used for fiber board, and 3 % is used for boiler fuel.

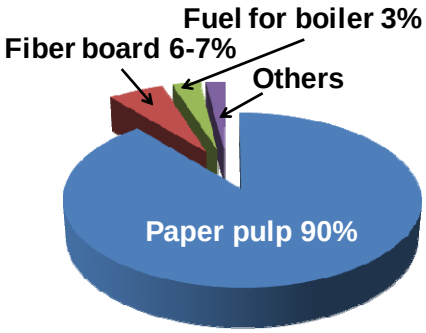

Figure 1. Use of wood chips in Japan. Original source: Report of Japan Woodchip Manufacturer's Association (March, 2010), arranged by the authors.

Table 1 and Figure 2 show the amounts of domestic and imported wood chips for the five year period 2004 to 2008. Note that this data is based on several statistical data sources, but still unofficial since there's no official data on Japan's wood chip supply. The total amount is seen to fluctuate around 20 million BDT. In these five years, 70 % of the wood chips were imported from foreign sources. In other words, since 90 % of wood chips are used for paper pulp (see Fig. 1), the amount of raw material for paper pulp is significantly dependent on importation from foreign sources.

Table 1. Japan wood chip supply. Original source: Report of Japan Woodchip Manufacturer's Association (March, 2010), arranged by the authors.

10^3 BDT(Bone Dry Ton)

Year	Supply			
	Total Amount	Domestic	Imported	% Imported
2004	19,756	5,782	13,974	71%
2005	20,116	6,005	14,111	70%
2006	19,673	5,899	13,774	70%
2007	20,229	5,894	14,335	71%
2008	20,518	5,797	14,721	72%

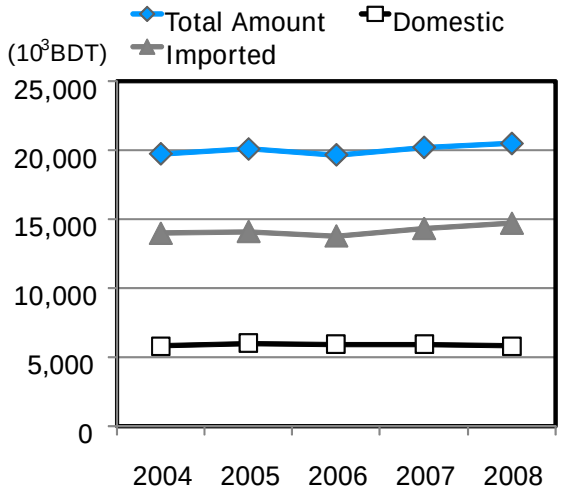

Figure 2. Source of wood chips for Japan. Original source: Report of Japan Woodchip Manufacturer's Association (March, 2010), arranged by the authors.

As described above, the domestic supply of wood chips has been about 30 % of the total over the past five years. Table 2 shows the main source material types for wood chips, and the fraction (in parentheses). Raw timber, residual lumber and demolition wood are the main wood chip sources. Recently, a larger fraction of raw timber has been used. By contrast, the amount of residual lumber has shrank, which occurred because many woodworking shops have gone out of business due to tough economic conditions. Regarding wood type, about 62 % of wood chips are derived from coniferous trees, and 38% from deciduous trees. In addition to thinned cobia wood, red pine is the main component of raw timber, and demolition wood chips include a large fraction of coniferous wood.

Table 2. Wood chip source materials for domestic supply in Japan. Original source: Report of Japan Woodchip Manufacturer's Association (March, 2010), arranged by the authors.

10^3BDT(Bone Dry Ton)

Year	Total Amount	Material Type				Wood Type	
		Raw timber	Residual Lumber	Forest Lumber	Demolition Wood	Conifer	Broad-leaved
2004	5782 (100.0)	2139 (37.0)	2198 (38.0)	58 (1.0)	1388 (24.0)	2938 (66.9)	1456 (33.1)
2005	6005 (100.0)	2235 (37.2)	2188 (36.6)	67 (1.1)	1515 (25.2)	2952 (65.7)	1538 (34.3)
2006	5899 (100.0)	2276 (38.6)	2275 (37.0)	66 (1.1)	1282 (21.7)	3004 (65.1)	1613 (34.9)
2007	5894 (100.0)	2368 (40.2)	2182 (37.0)	100 (1.7)	1244 (21.1)	3087 (66.4)	1563 (33.6)
2008	5797 (100.0)	2676 (46.2)	1913 (33.0)	104 (1.8)	1104 (19.0)	2918 (62.2)	1775 (37.8)

Regarding imported wood chips, which comprise about 70 % of the total supply, these are mainly derived from residual lumber from sawmills and pulp wood from forested areas. Table 3 and Figure 3 break down the source of imported wood chips by country and wood type. Unlike domestic wood chips, deciduous chips comprise 75 % of the total imported amount, and the amount of deciduous wood is three times greater than coniferous wood. This seems to be attributed to the fact that most imported broad-leaved wood chips consist of plantation wood, such as early growth eucalyptus and acacia. Most of the deciduous wood is imported from fourteen countries, and the five main ones are Australia (36 %), Chile (19 %), South Africa (18 %), Viet Nam (9 %), and Brazil (6 %). On the other hand, coniferous wood is imported from ten countries, primarily Australia (40 %) and the US (30 %). It could be said that the wood chip market in foreign countries is now in a state of “oversupply” due to the world economic downswing. However, in addition to Brazil, Russia, India, China (BRIC Countries), and the Middle East, developing countries are expected to demand a larger amount of wood chips in the medium term. Thus there are concerns that the supply-and-demand balance would tend towards a tight supply.

Table 3. Wood chip supply and volume by major country. Original source: Japan Ministry of Finance, Trade Statistics of Japan. Arranged by the authors.

10^3BDT(Bone Dry Ton)

Year		2004	2005	2006	2007	2008
Conifer	Australia	1,215	1,083	1,028	1,053	1,087
	US	789	799	760	690	684
	New Zealand	228	232	192	274	310
	Canada	118	148	272	242	194
	Fiji	148	111	111	114	116
	Other	286	252	81	122	58
	Subtotal	2,784	2,625	2,444	2,495	2,449
Broad-leaved	Australia	3,701	3,703	3,876	4,462	4,464
	Chile	1,481	1,628	1,774	2,011	2,350
	South Africa	3,208	3,187	2,757	2,458	2,161
	Viet Nam	606	644	720	903	1,071
	Brazil	553	613	536	735	690
	Other	1,641	1,711	1,667	1,271	1,536
	Subtotal	11,190	11,486	11,330	11,840	12,272
Total		13,974	14,111	13,774	14,335	14,721

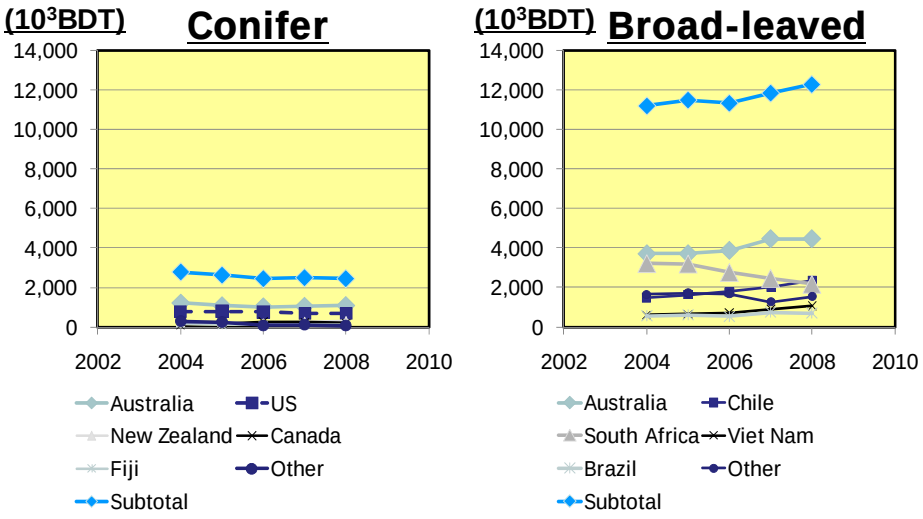

Figure 3. Amount and major source country for imported wood chips. Original source: Report of Japan Woodchip Manufacturer's Association. (March, 2010), arranged by the authors.

Supply and Production of Wood Pellets in Japan

Wood pellets are made from brushwood, logs, tree bark, leaves, and scrap wood. These materials are crushed and compressed into small cylindrical chunks roughly 1 cm in diameter and 1-2 cm in length. Compared to wood chips or sawn wood (both made without the compression process) wood pellets have much higher energy density and thus can be a more worthy fuel. Figure 4 shows that the amount of imported wood pellets rapidly increased starting in 2007. This is thought to be related to a significant increase in the demand for wood pellets as a fuel for power

generation, and significantly cheaper imported pellets compared to domestic pellets.

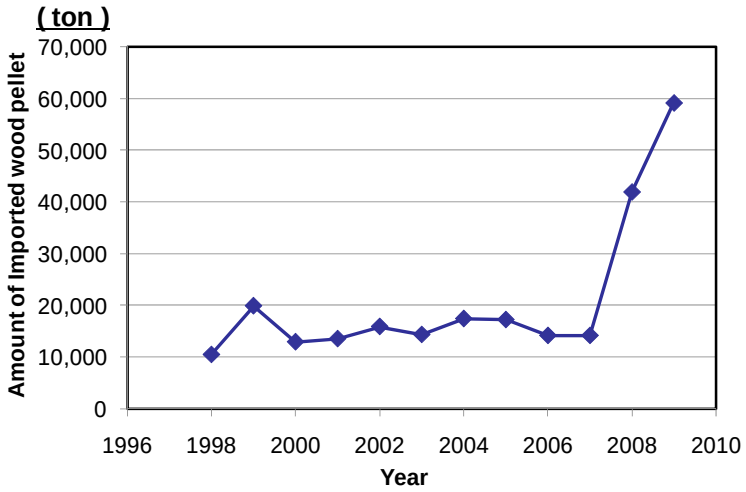

Figure 4. Amount of imported wood pellets by year. Original source: Japan Wood Pellet Association News, No. 2 (Aug. 2010), arranged by the authors.

As seen in Table 4, the amount of wood pellets imported from Canada is much higher than from other countries, and, notably, the volume from Canada rapidly increased. Canada is a major global wood pellet producer and exporter. The amount of wood pellets imported from Viet Nam to Japan is the second largest.

Looking next at the domestic supply of wood pellets, Figure 5 shows that the production volume and the number of wood pellet production plants has increased remarkably, and the amount of wood pellet production reached 50,000 tons in 2009. However, in spite of this increase, the imported wood pellet volume dwarfs the domestic supply volume.

Table 4. Amount of imported wood pellets by country. Original source: Japan Wood Pellet Association News, No. 2 (Aug. 2010), arranged by the authors.

Unit: ton

Country	2007 (1~12)	2008 (1~12)	2009 (1~12)	2010 (1~6)	Estimated Price[¥/kg] 2010(1~6)
Canada	7323	34931	49498	31567	17.5
China	2129	2506	4369	1489	44.4
New Zealand	2129	1947	1919	1099	60.2
Vietnam	0	0	1019	4894	12.4
Netherlands	908	1050	914	310	57.6
America	741	716	731	527	39.5
Chile	0	0	24	76	24.6
Other	867	748	669	293	
Total	14097	41898	59143	40255	

Year	Production (Ton)	Plant (#)
2003	2,400	10
2004	3,700	13
2005	8,700	18
2006	22,500	38
2007	32,600	47

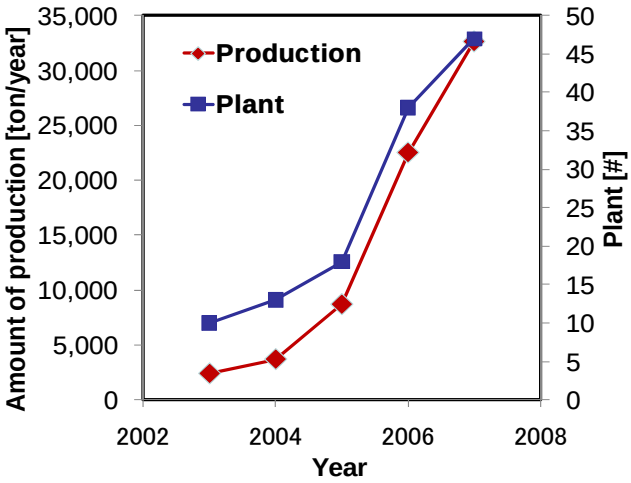

Figure 5. Production of wood pellets in Japan. Original source: Japan Wood Pellet Association, URL (in Japanese) http://www.mokushin.com/jpa/index2.html, arranged by the authors.